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EXAMINER	
CRAIG, DWIN M	

ART UNIT	PAPER NUMBER
2123	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/765,820	BAHEL ET AL.	
	Examiner	Art Unit	
	DWIN M. CRAIG	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 January 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14,16-21,23-25 and 27-56* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14, 16-21, 23-25 and 27-56* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *7/11/2007*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-14, 16-21, 23-25 and 27-54 have been presented for reconsideration based on Applicants' arguments. Claims 55 and 56 have been presented for examination.

Response to Arguments

2. Applicants' arguments presented in the 1/18/2008 responses have been fully considered; the Examiner's response is as follows:

2.1 Regarding the Applicants' response to the Double Patenting rejection of claim 43, the Examiner will maintain the rejection until the Applicants' submit a terminal disclaimer.

2.2 Regarding the 35 U.S.C. 103(a) rejections of claims 1, 2, 3, 5, 6, 11, 12 and 13, Applicants' argued on page 14;

"The Examiner agrees that "Rossi does not expressly disclose, selecting a flow control device based on an output of said model' and points to Renders for these limitations of Claim 1. See Office Action, 07/18/2007, p. 6. Renders, however, likewise fails to disclose selecting a flow control device based on an output of the model."

The Examiner find this argument persuasive and withdraws the previously applied prior art rejections of claims 1, 2, 3, 5, 6, 11, 12 and 13.

2.3 Regarding the interview summary and the telephonic interview that took place on 3/5/2008, the Examiner thanks the Applicants' for submitting a proposed amendment to further clarify the meets and bounds of independent claim 1, however, the Examiner had not discovered the new prior art reference that is being presented in this non-final office action and therefore claim 1, as amended, it is respectfully submitted, is not in condition for allowance.

2.4 An updated search has revealed new art.

2.5 Regarding Applicants' arguments regarding the 35 U.S.C. 103(a) rejections of claims 43, 16, 17 , 18, 19, 20, 24, 25 and 44-48, Applicants' argued on page 16 of the 1/18/2008 responses;

"Further, both Kumada and Scherer et al. are silent as to processing the condensing unit parameters, the evaporator parameters, the compressor parameters and the refrigerant properties through a model of a cooling system and generating system outputs based on the processing. As discussed above, neither Kumada nor Scherer et al. disclose inputting refrigerant properties. Consequently, neither Kumada nor Scherer et al. disclose processing refrigerant properties through a model of a cooling system."

The Examiner respectfully traverses Applicants' arguments, pages 13 & 14 witch contain section [0021] of Kumada clearly teaches inputting evaporator, compressor and refrigerant properties;

"In the main processor 7, *characteristic computations for the condensers are performed based on the evaporation temperature and condensation temperature set by the operator in step S702,* and the coolant flow volumes are found. Next, in step S703, *characteristic computations for the evaporators are performed* and the coolant flow volumes are found. Then, in step S704, *characteristic computations for the condensers are performed* and the coolant flow volumes are found." *Emphasis added.*

These computations are not possible without the input of characteristic properties of the evaporator, compressor, and refrigerant properties.

The previously applied rejections of claims 43, 16, 17 , 18, 19, 20, 24, 25 and 44-48 will be maintained.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claim 43 is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 12 and 13 of U.S. Patent No. 7010926. Although the conflicting claims are not identical, they are not patentably distinct from each other because both claims model a cooling system, claim 43, *a method of computer-based simulation of cooling system,* claim 13 *processing said condensing unit characteristics and compressor characteristics based on said multiple simulation points,* both claims teach *condensers and evaporators with parameters* in the simulation, both claims disclose selecting a *refrigerant characteristic* in the claim 43 *inputting refrigerant properties for a refrigerant flowing through said cooling system* in claim 13, *...and refrigerant type*, claim 43 teaches *at least one of said condensing and said evaporator parameters including configuration information for a heat exchanger of said cooling system,* claim 12 teaches, *selecting an application type for an evaporator* and *processing said*

condensing unit characteristics, regarding the limitation of a *heat exchanger* in section [0002] is discloses, *The condensing unit operates as a heat exchanger...* therefore the teaching of a condensing unit in claim 12 meets the claimed limitation of a *heat exchanger* as disclosed in claim 43. Both claims disclose the teaching of an output, claim 43; *generating system outputs based in said processing* claim 12, *outputting thermal performance data...*

Therefore, it would have been obvious, to an artisan of ordinary skill, at the time the invention was made to have taken the expressly claimed teachings of claims 12 and 13 of U.S. patent 7010926 and then derived the express teachings of the claim 43 as presented in the current instant application.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was

commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1, 2, 3, 5, 6, 11, 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6,701,725 to Rossi in view of U.S. Patent 6,629,008 to Shiiba et al.

4.1 Regarding independent claim 1, *Rossi* discloses, *a method of computer-based simulation of a cooling system* (Figure 1 and the accompanying text and Col. 2 lines 13-24 and Col. 5 lines 16-36 *Rossi* is teaching modeling the performance of a cooling system which teaches the functionality of a simulator), *comprising: inputting condenser parameters* (Figure 3 "Parameter input" Col. 10 lines 27-67 and Col. 11 lines 1-20 and Col. 12 lines 34-41), *evaporator parameters* (Figure 3 "Parameter input" and Col. 15 lines 48-51 and Col. 6 lines 43-44 "…assumptions about the evaporator are made…") *and compressor parameters for said cooling system* (Figure 3 "Parameter input" and Col. 6 lines 55-67 and Col. 7 lines 1-45); *processing said condenser parameters, said evaporator parameters and said compressor parameters through a model of said cooling system* (Figure 1 and the accompanying text and Col. 5 lines 16-45), *and a flow control device* (Figure 1 # 14 and Col. 4 lines 10-28 "expansion device" and Col. 4 lines 51-56 "reversing valve").

However, *Rossi* does not expressly disclose, *selecting a flow control device based on an output of said model.*

Shiiba et al. clearly teaches selecting multiple flow control devices (Figure 5A and Col. 7 lines 49-67 and Col. 8 lines 1-26 see also Col. 4 lines 6-37).

Rossi and *Shiiba et al.* are analogous art because they both come from the same problem solving area of cooling systems.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have used the teachings of *Shiiba et al.* for selecting different flow control devices when designing an HVAC system.

The motivation for doing so would have been to provide a production control system that efficiently processes the building of cooling system(s) by dividing the components into functional blocks and further reduce economic loss and improve productivity, *just as a cooling system simulator would do,* see *Shiiba et al.* (Col. 2 lines 46-57 and Col. 18 lines 38-57).

Therefore, it would have been obvious to combine *Shiiba et al.* with *Rossi* to obtain the invention as specified in claims 1, 2, 3, 5, 6, 11, 12 and 13.

4.2 Regarding claim 2, *Rossi* teaches, *said flow control device includes one of a capillary tube device and an orifice device* (Col. 4 line 14 "...capillary tube of fixed orifice...").

4.3 Regarding claim 3, *Rossi* teaches *comprising selecting a flow control parameter including a sub-cooling temperature and a superheat temperature* (Col. 3 lines 43-57).

4.4 Regarding claim 5, *Rossi* discloses, *determining refrigerant mass flow rates* (Col. 10 lines 61-65).

4.5 Regarding claim 6, *Rossi* teaches, *wherein said properties include refrigerant charge and one of refrigerant superheat temperature and refrigerant sub-cooling temperature* (Col. 5 lines 7-15 "refrigerant charge..." and Col. 2 lines 41-53"superheat").

4.6 Regarding claim 11, *Rossi* teaches *modeling tubing and heat transfer characteristics* (Figure 1 and Col. 5 line 45-52see also Col. 5 lines 46-59).

4.7 Regarding claim 12 while *Rossi* does not expressly disclose where said output is effected by parameters based on accumulator parameters, *Rossi* does teach that the output is effected by parameters relating to other elements of the cooling system, *see Figures 2 & 3 and Col. 12 lines 24-50.*

Therefore one of ordinary skill would find it obvious that any changes to the parameters of any element of the cooling system would affect the output, including the accumulator.

4.8 Regarding claim 13, *Rossi* teaches *wherein said condenser parameters and said compressor parameters are input as air-cooled condensing unit parameters* (Figure 1 # 12 and Col. 3 lines 58-67 and Col. 4 lines 1-9 and Col. 5 lines 37-45).

5. Claims 43, 16, 17, 18, 19, 20, 23, 24, 25 and 44-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese Laid Open Application Number H 9-257319 to Sachiko Kumada hereafter referred to as Kumada in view of U.S. Patent 3,708,998 to Scherer et al.

5.1 Regarding Claim 43, *Kumada* discloses, *a method of computer-based simulation of a cooling system,* (page 2 Abstract "conducting simulations of coolant circuits") *comprising: inputting condensing unit parameters, evaporator parameters and compressor parameters for said cooling system;* (page 10 "In step S203, the generated main processor 7 reads in specification data related to the configuring elements (compressor, evaporator, condenser) from the database file"), *inputting refrigerant properties for a refrigerant flowing through said cooling system;* (section [0011], page 8 "computing the coolant flow volume") *including configuration information for a heat exchanger of said cooling system* (page 28 figure 11

"HEAT exchanger #3), *processing said condensing unit parameters, said evaporator parameters and said compressor parameters through a model of said cooling system; and generating system outputs based on said model* (page 9 section [0013] "And item 10 is an output file…").

However, while *Kumada* does not expressly disclose, *inputting refrigerant properties for a refrigerant flowing through said cooling system, Kumada* does teach computing coolant flow volume, which is teaching a *property* of how the *refrigerant* is being modeled in the simulation.

Scherer et al. teaches; Col. 1 lines 56-63 "Superheat temperature of refrigerant is defined as the temperature of the refrigerant above its boiling point for any given temperature".

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have provided in a simulation of a cooling system a method of inputting *refrigerant properties for a refrigerant flowing through said cooling system* as disclosed in *Scherer et al.* in the cooling system simulator of *Kumada*.

The suggestion for doing so would have been to provide for the fact that without knowing the *Superheat temperature* of the coolant being used in the cooling system the simulation would fail to accurately simulate the performance of a given cooling system, Col. 1 lines 30-67 of *Scherer et al.*

Therefore, it would have been obvious to combine *Scherer et al.* with *Kumada* in order to obtain the invention as specified in claims 43, 16, 17, 18, 19, 20, 23, 24 and 25.

5.2 Regarding claim 16, *Kumada* discloses, *generating a list of available condensing units, selecting a condensing unit from said list of available condensing units and automatically inputting said condensing unit parameters based on said selected condensing unit* (see Figure 3 and Figures 8-10 and the descriptive text).

5.3 Regarding claim 17, *Kumada* discloses, *wherein said condensing unit parameters include compressor parameters and condenser parameters* (see Figure 3 and Figures 8-10 and the descriptive text)

5.4 Regarding claim 18, *Kumada* discloses the functional equivalent of, *selecting a flow control device for said cooling system based on said system outputs* (see Figure 3 and Figures 8-10 and the descriptive text).

5.5 Regarding claim 19, *Kumada* discloses, *wherein said flow control device includes one of a capillary tube device and an orifice device* (see Figure 3 and Figures 8-10 and the descriptive text).

5.6 Regarding claim 20, *Kumada* does not expressly disclose, *selecting a flow control parameter including a sub-cooling temperature and a superheat temperature.*

However, *Scherer et al.* teaches, Col. 1 lines 40-49, "…the diaphragm and valve member move to open the passage and admit more liquid refrigerant into the evaporator to increase the evaporator pressure" as well as, Col. 1 lines 56-63 "Superheat temperature of refrigerant is defined as the temperature of the refrigerant above its boiling point for any given temperature".

5.7 Regarding claim 23, *Kumada* does not expressly disclose, *wherein said properties include refrigerant charge and one of refrigerant superheat temperature and refrigerant sub-cooling temperature.*

However, *Scherer et al.* teaches, Col. 1 lines 40-49, "…the diaphragm and valve member move to open the passage and admit more liquid refrigerant into the evaporator to increase the evaporator pressure" as well as, Col. 1 lines 56-63 "Superheat temperature of refrigerant is defined as the temperature of the refrigerant above its boiling point for any given temperature".

5.8 Regarding claim 24, *Kumada* discloses, *further comprising inputting tubing and line heat transfer parameters, wherein said system outputs are further based on said tubing and line heat transfer parameters* (see Figure 10 and the descriptive text).

5.9 Regarding claims 25, *Kumada* discloses, *inputting accumulator parameters, wherein said system outputs are further based on said accumulator parameters* (section [0035] page 20 "specification data can be accumulated…").

5.10 Regarding claim 44, *Kumada* discloses, *tube geometry information of said heat exchanger* (Figures 10, 11 and 12 and the descriptive text for those figures).

5.11 Regarding claim 45, *Kumada* discloses, *horizontal tube spacing information, vertical tube spacing information, outside diameter of tubing information and tubing type information* (Figures 10, 11 and 12 and the descriptive text for those figures).

5.12 Regarding claim 46, *Kumada* does not expressly disclose, *equivalent parallel refrigerant circuits information,* however, *Scherer et al.* teaches; Col. 1 lines 56-63 "Superheat temperature of refrigerant is defined as the temperature of the refrigerant above its boiling point for any given temperature".

5.13 Regarding claim 47, *Kumada* discloses, *fin geometry information* (Figures 10, 11 and 12 and the descriptive text for those figures).

5.14 Regarding claim 48, *Kumada* discloses, *wherein said fin geometry information includes at least one of fin density information and fin type information* (Figures 10, 11 and 12 and the descriptive text for those figures).

6. Claims 8, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6,701,725 Rossi in view of U.S. Patent 6,629,008 to Shiiba et al. as applied to claims 1, 2, 3, 5, 6, 11, 12 and 13 above and in further view of US Patent 5,687,094 Kagawa.

6.1 Regarding claim 8, *Rossi* as modified by *Renders* does not expressly disclose *generating a list of compressors*.

Kagawa discloses *generating a list of available compressors based on search parameters, selecting a compressor from said list of available compressors and automatically inputting said compressor parameters based on said selected compressor* (Col. 6 lines 26-58).

Rossi and *Kagawa* are analogous art because they are from the same problem solving area of modeling complex systems.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have used the knowledge based systems of *Kagawa* in combination with the cooling system modeling systems of *Rossi*.

The motivation for doing so would have been to provide an industrial product design verification process where verification experience is accumulated and efficiency is improved *see Col. 1 lines 58-62 Kagawa*.

Therefore, it would have been obvious to combine *Kagawa* with *Rossi* to obtain the invention specified in claims 8, 9 and 10.

6.2 As regards claim 9, *Rossi* discloses, *said search parameters include at least one of a model number, a voltage, a phase, a frequency, a refrigerant type, an application type and a capacity* (Col. 8 lines 15-31).

6.3 As regards claim 10, *Rossi* discloses, *wherein said search parameters include a capacity and a capacity tolerance* (Col. 1 lines 14-63 see also Figure 2 "Capacity Index").

7. Claims 49, 27-31, 33, 34, 37-39, 41 and 52 are rejected as being unpatentable over US Patent 6,701,725 Rossi in view of US Patent 6,990,821 Singh.

7.1 Regarding claim 49, *Rossi* discloses, *a method of computer-based simulation of a cooling system, comprising:* (Figure 1 and the accompanying text and Col. 2 lines 13-24 and Col. 5 lines 16-36 *Rossi* is teaching modeling the performance of a cooling system which teaches the functionality of a simulator) *inputting condenser parameters,* (Figure 3 "Parameter input" Col. 10 lines 27-67 and Col. 11 lines 1-20 and Col. 12 lines 34-41) *evaporator parameters* (Figure 3 "Parameter input" and Col. 15 lines 48-51 and Col. 6 lines 43-44 "…assumptions about the evaporator are made…") *and compressor parameters for said cooling system;* (Figure 3 "Parameter input" and Col. 6 lines 55-67 and Col. 7 lines 1-45), *automatically inputting said air properties into a model of said cooling system; and processing said condenser parameters, said evaporator parameters and said compressor parameters through said model* (Figure 1 and the descriptive text and Figures 2 & 3 and Col. 10-12 describe the process of how the model functions as claimed).

Regarding the newly amended limitation, *at least one of said condenser parameters and said evaporator parameters including configuration information for a heat exchanger* the Examiner notes that in Applicants' specification is disclosed in section [0002], *The condensing unit operates as a heat exchanger…* therefore the teaching of a condensing unit in claim 12 meets the claimed limitation of a *heat exchanger* as disclosed in the current claim language.

However, *Rossi* does not expressly disclose, *calculating air properties based on a dry bulb temperature,* the examiner notes that *Rossi* does disclose *wet bulb temperature* (Col. 10 lines 16-24).

Singh discloses *calculating air properties based on a dry bulb temperature* (Col. 7 lines 58-67 and Col. 8 lines 1-5).

Rossi and *Singh* are analogous art because they are from the same problem solving area modeling cooling systems.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have used cooling system modeling systems of *Singh* in combination with the cooling system modeling systems of *Rossi*.

The motivation for doing so would have been to provide a method for monitoring system performance including energy consumption for one or more buildings, *see Singh Col. 1 lines 44-67).*

Therefore it would have been obvious to combine *Singh* with *Rossi* to obtain the invention specified in claims 49, 27-31, 33, 34, 37-39 and 41.

7.2 Regarding claim 27 *Rossi* does not expressly disclose generating a table, however, *Singh* discloses, *wherein said step of calculating said air properties includes generating an air properties table based on said dry bulb temperature* (Figure 8).

7.3 Regarding claim 28 *Rossi* does not expressly disclose generating a graph, however, *Singh* discloses, *wherein said step of calculating said air properties includes generating an air properties graph based on said dry bulb temperature* (Figure 21 & 22).

7.4 Regarding claim 29 *Rossi* discloses the functional equivalent of *selecting a flow control device* (Col. 7 lines 10-15 "select a set of coefficients" and Figure 1 # 14 and Col. 4 lines 9-56).

7.5 Regarding claim 30 *Rossi* discloses, *wherein said flow control device includes one of a capillary tube device and an orifice device* (Col. 4 line3 15-16).

7.6 Regarding claim 31 *Rossi* discloses, *further comprising selecting a flow control parameter including a sub-cooling temperature* (Col. 8 lines 32-40) *and a superheat temperature* (Col. 7 lines 53-63).

7.7 Regarding claim 33 *Rossi* discloses, *further comprising inputting properties for a refrigerant flowing through said cooling system, wherein said output is further based on said refrigerant properties* (Col. 5 lines 62-67 and Col. 6 lines 1-21).

7.8 Regarding claim 34 *Rossi* discloses, *wherein said properties include refrigerant charge and one of refrigerant superheat temperature and refrigerant sub-cooling temperature* (Col. 8 lines 32-40 and Col. 7 lines 53-63).

7.9 Regarding claim 37 *Rossi* discloses, *wherein said search parameters include at least one of a model number, a voltage, a phase, a frequency, a refrigerant type, an application type and a capacity* (Col. 8 lines 15-31).

7.10 Regarding claim 38 *Rossi* discloses, *wherein said search parameters include a capacity and a capacity tolerance* (Col. 1 lines 14-63 see also Figure 2 "Capacity Index").

7.11 Regarding claim 39 *Rossi* discloses, *further comprising inputting tubing and line heat transfer parameters, wherein said output is further based on said tubing and line heat transfer parameters* (Col. 3 lines 24-34, Col. 4 lines 9-27, Col. 5 lines 46-62).

7.12 Regarding claim 41 *Rossi* discloses, *wherein said condenser parameters and said compressor parameters are input as air-cooled condensing unit parameters* (Col. 8 lines 17-67).

7.13 Regarding claim 52, *Kumada* does not expressly, *equivalent parallel refrigerant circuits information, Scherer et al.* teaches; Col. 1 lines 56-63 "Superheat temperature of refrigerant is

defined as the temperature of the refrigerant above its boiling point for any given temperature".

8. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Rossi* as modified by *Singh* as applied to claims 49, 27-31, 33, 34, 37-39 and 41 above, and further in view of US Patent 5,687,094 Kagawa.

Rossi as modified by *Singh* teaches a modeling a cooling system as recited in claims 26-31, 33, 34, 37-39 and 41 for the reasons above, differing in that their combined teaching lacks

(claim 36) wherein said step of inputting compressor parameters includes generating a list of available compressors based on search parameters, selecting a compressor from said list of available compressors and automatically inputting said compressor parameters based on said selected compressor.

Kagawa teaches (claim 36) *wherein said step of inputting compressor parameters includes generating a list of available compressors based on search parameters, selecting a compressor from said list of available compressors and automatically inputting said compressor parameters based on said selected compressor* (Col. 6 lines 26-58).

Rossi as modified by *Singh* and *Kagawa* are analogous art because they are all related to modeling the performance of a cooling system.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the compressor list generation methods of *Kagawa* in the cooling system modeling methods of *Singh* and *Rossi* because it would be advantageous to provide an industrial product design verification process where verification experience is accumulated and efficiency is improved *see Col. 1 lines 58-62 Kagawa.*

9. Claims 4, 7, 14 and 21 are rejected under 35 U.S.C. 103 (a) as being unpatentable over US Patent 6,701,725 Rossi in view of U.S. Patent 6,629,008 to Shiiba et al. as applied to claims 1, 2, 3, 5, 6, 11 and 13 and in further view of U.S. Patent 4,885,694 Pray.

9.1 Regarding claims 4 and 21, *Rossi* as modified by *Renders* does not expressly disclose, *generating a list of flow control devices.*

Pray discloses *generating a list of flow control devices,* (Figure 6 # 320 and more specifically # 618 and the descriptive text and Col. 13 lines 40-64 more specifically on line 63 "...valve sizing program for generating...").

Rossi and *Shiiba et al.* as modified by *Pray* are analogous art because they are both from the similar problem solving area of modeling complex systems.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have used the CAD methods of *Pray* in combination with the cooling system methods of *Rossi* as modified by *Renders*.

The suggestion for doing so would have been to automate the design process and decrease the amount of time required for designing building control systems (*Pray Col. 1 lines 24-27*).

Therefore, it would have been obvious to combine *Pray* with *Rossi* as modified by *Shiiba et al.* to obtain the invention specified in claims 4, 7, 14 and 21.

9.2 Regarding claim 7, *Rossi* as modified by *Shiiba* does not expressly disclose *generating a list of available condensers*.

However, *Pray* teaches generating a list of devices used in the design of systems in a building, (Figure 6 # 320 and more specifically # 618 and the descriptive text and Col. 13 lines 40-64 more specifically on line 63 "...valve sizing program for generating...").

It view of the teachings of *Pray* generating a list of available elements of a cooling system using a design tool would be obvious.

9.3 Regarding claim 14, *Rossi* as modified by *Shiiba et al.* does not expressly disclose *generating a list of available air-cooled condensing units*.

However, *Pray* teaches generating a list of devices used in the design of systems in a building, (Figure 6 # 320 and more specifically # 618 and the descriptive text and Col. 13 lines 40-64 more specifically on line 63 "…valve sizing program for generating…").

It view of the teachings of *Pray* generating a list of available elements of a cooling system using a design tool would be obvious.

10. Claims 32, 35 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Rossi* as modified by *Singh* as applied to claims 49, 27-31, 33, 34, 37-39 and 41 above, and further in view of U.S. Patent 4,885,694 Pray.

Rossi as modified by *Singh* teaches a modeling a cooling system as recited in claims 49, 27-31, 33, 34, 37-39 and 41 for the reasons above, differing in that their combined teaching lacks,

(claim 32) "…generating a list of available flow control devices…",

(claim 35) "…generating a list of available condensers…",

(claim 42) "…generating a list of available air-cooled condensing units…".

Pray discloses *generating a list of flow control devices,* (Figure 6 # 320 and more specifically # 618 and the descriptive text and Col. 13 lines 40-64 more specifically on line 63 "…valve sizing program for generating…") and in view of this teaching of *Pray* it would have

been obvious to further generate a list of *condensing units* as well as a list of *air-cooled condensing units*.

Rossi as modified by *Singh* and *Pray* are analogous art because they are all from the same problem solving area of design tools and modeling of complex systems.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention to generate a list of available elements of a cooling system using a design tool as disclosed in the teachings of *Pray*.

11. Claim 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6,701,725 Rossi in view of US Patent 6,990,821 Singh.

11.1 Regarding claim 40, while *Rossi* and *Singh* do not expressly disclose inputting accumulator parameters, wherein said output is further based on said accumulator parameters, *Rossi* does teach that the output is effected by parameters relating to other elements of the cooling system, *see Figures 2 & 3 and Col. 12 lines 24-50.*

Therefore one of ordinary skill would find it obvious that any changes to the parameters of any element of the cooling system would affect the output, including the accumulator.

12. Claims 50, 51, 53 and 54 are rejected as being unpatentable over Rossi as modified by Singh as applied to claims 49, 27-31, 33, 34, 37-39, 41 and 52 above and in further view of Japanese Laid Open Application Number H 9-257319 to Sachiko Kumada referred to as Kumada.

Rossi as modified by *Singh* teaches a modeling a cooling system as recited in claims 49, 27-31, 33, 34, 37-39 and 41 for the reasons above, differing in that their combined teaching lacks,

(claim 50) "*...tube geometry information of said heat exchanger...*",

(claim 51) "*...horizontal tube spacing information, vertical tube spacing information, outside diameter of tubing information and tubing type information...*",

(claim 53) "*...tube geometry information of said heat exchanger...*".

(claim 54) "*...wherein said fin geometry information includes at least one of fin density information and fin type information...*"

Kumada teaches, (claims 50, 51, 53 & 54) *tube geometry information of said heat exchanger* (Figures 10, 11 and 12 and the descriptive text for those figures), *horizontal tube spacing information, vertical tube spacing information, outside diameter of tubing information and tubing type information* (Figures 10, 11 and 12 and the descriptive text for those figures), *fin geometry information* (Figures 10, 11 and 12 and the descriptive text for those figures), *wherein said fin geometry information includes at least one of fin density information and fin type information* (Figures 10, 11 and 12 and the descriptive text for those figures).

Rossi as modified by Singh and Kumada are analogous art because they are both from the same problem solving area of cooling systems.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the cooling system methods of Kumada in combination with the cooling systems teachings of Rossi as modified by Singh because Kumada teaches that the operation of the cooling system simulation is simplified and execution efficiency is improved

because of the disclosed methods as taught in Kumada, see section [0042] on page 21 of Kumada.

13. Claim 55 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kumada in view of Scherer et al. as applied to claim 43 above and in further view of U.S. Patent 6,510,698 to Kasai et al.

Kumada as modified by Schere et al. teaches a cooling system simulator as disclosed in claim 43 for the reasons above in that the combined teaching lacks;

(claim 55) "…wherein said configuration information includes a number of equivalent parallel refrigerant circuits information…"

Kasai et al. teaches, *parallel refrigerant circuits* (Col. 53 lines 15-29).

Kumada as modified by *Schere et al.* and *Kasai et al.* are analogous art because they are both related to cooling systems.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the parallel refrigerant circuits of *Kasai et al.* with the cooling system simulation system of *Kumada* and the flow control device teachings of *Schere et al.* because, an artisan would want to model the operation of a parallel system because this type of system yields an environmentally friendly solution to leakage of old refrigerants and contaminates, see *Kasai et al.* (Col. 53 lines 9-15).

14. Claim 56 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rossi in view of Singh as applied to claim 49 above, and in further view of U.S. Patent 6,510,698 to Kasai et al.

Rossi as modified by Singh teaches a cooling system simulator as disclosed in claim 49 for the reasons above in that the combined teaching lacks;

(claim 56) "...wherein said configuration information includes a number of equivalent parallel refrigerant circuits information..."

Kasai et al. teaches, *parallel refrigerant circuits* (Col. 53 lines 15-29).

Rossi as modified by *Singh* and *Kasai et al.* are analogous art because they are both related to cooling systems.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the parallel refrigerant circuits of *Kasai et al.* with the cooling system simulation system of *Rossi* and the teachings of *Singh* because, an artisan would want to model the operation of a parallel system because this type of system yields an environmentally friendly solution to leakage of old refrigerants and contaminates, see *Kasai et al.* (Col. 53 lines 9-15).

Conclusion

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DWIN M. CRAIG whose telephone number is (571)272-3710. The examiner can normally be reached on 10:00 - 6:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul L. Rodriguez can be reached on (571) 272-3753. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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